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Electron-spin g-factor engineering with Si/Ge heterostructures.

Seungwon Lee, Fabiano Oyafuso, Paul von Allmen, and Gerhard Klimeck
Jet Propulsion Laboratory, California Institute of Technology

K. Birgitta Whaley
Department of Chemistry, University of California at Berkeley

Electron-spin g-factor engineering with Si/Ge heterostructures is a promising candidate for single-qubit logic gates thanks to a fast manipulation, a long spin coherence time and a scalability of the number of quantum bits. The g-factors of the electron spins are investigated with spds* nearest-neighbor tight-binding model. The electrons are modeled to be bound by either donor impurities or quantum dots. Tight-binding calculations for the dependence of the g-factors on Si/Ge composition ratios, dot sizes and magnetic fields are presented.